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ABSTRACT

A prototype simulation measure of the negotiating skill of interpersonal competence is described, and results of an initial validation study are reported. Of eight negotiating skills identified by the Secretary's Commission on Achieving Necessary Skills of the U.S. Department of Labor, two were the focus of the measure: proposing and examining possible options and making reasonable compromises. A simulation was developed focusing on these skills in a job contract negotiation between a potential employee and an employer. The validity study of this measure was based on an expert/novice criterion group approach, assuming that expert negotiators would receive better counter-offers than would novices. Ten experts were chosen from graduate students who had completed a course in negotiation in a Masters in Business Administration program and 21 novices were chosen from a high school business class. Results, generally supportive of the hypothesis, provide evidence of the validity of the simulation as a measure of negotiation skills. Both the assessment of options and the consideration of compromises are important components of negotiating skill. Eight tables of study results are included. (Contains 37 references.) (SLD)

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Report of Task Forces on Technology and Workforce Issues

Simulation as a Performance Assessment Technique for the Interpersonal Skill of Negotiation

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SIMULATION AS A PERFORMANCE ASSESSMENT TECHNIQUE FOR THE INTERPERSONAL SKILL OF NEGOTIATION

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Introduction

The Cognitive Science Laboratory of USC has a subcontract with the Center for Research on Evaluation, Standards, and Student Testing (CRESST) at the University of California, Los Angeles to assist in the domain-independent measurement of workforce readiness skills. In turn, CRESST/UCLA has an existing collaborative agreement from the Office of Educational Research and Improvement to study methodologies for the assessment of competencies needed for the workforce. CRESST/UCLA areas of interest include both assessment and policy issues. In this report (Deliverable 4 on the USC subcontract) we describe one prototype measure of the negotiating subskill of interpersonal competency. We also report the results of an initial validation study of that measure.

Current economic difficulties and the challenge of competing in the world market have necessitated a rethinking of American approaches to the utilization of people in organizations. Management now recognizes a need to have workers take on more responsibility at the points of production, of sales, and of service rendered, if the United States is to compete in rapidly changing world markets. In order to adapt to the need to introduce new products and services quickly with high quality, managers are increasingly emphasizing participative management, flatter organizational structure, just-in-time management, total quality management, and team work.

These developments mean that much more is expected of even entry-level members of the American workforce. Beyond generally greater responsibilities, these developments also mean that workers must carry out

those responsibilities to greater degrees in cooperation with other workers. Consequently, interpersonal skills are becoming increasingly important to successful performance in the American workforce. All five major studies examining workforce skills that we reviewed in an earlier report (O'Neil, Allred, & Baker, 1992b) identified interpersonal skills as a major category of job skills critical in today's workforce. Although the studies varied considerably in the particular interpersonal skills they found to be important, most identified negotiation and conflict resolution as priorities. Because of their documented importance in the workforce, we have developed a measure of negotiation skills and have conducted an initial study of its validity.

Defining Negotiation Skills for Measurement

In developing this measure, we followed the general methodology for the development of workforce readiness measures (see Table 1) elaborated in an earlier report (O'Neil, Allred, & Baker, 1992a). That methodology suggests that measures of a performance competency like workforce competencies begin with a job and task analysis to identify the particular skills necessary for performance in the domain of interest. Subsequently, the relevant research literature is surveyed for the cognitive indicators documented to correlate with performance on those identified skills. Particular competency measures can then be developed based on those cognitive indicators.

Our analysis was informed by work conducted by the Secretary's Commission on Achieving Necessary Skills (SCANS, 1991, 1992) for the U.S. Department of Labor. The SCANS study defined *negotiate* as working towards an agreement that may involve exchanging specific resources or resolving divergent interests (SCANS, 1991, p. 31). The SCANS analysis further elaborated that the negotiation skills necessary for workforce performance are: (a) researching opposition and the history of the conflict, (b) setting realistic and attainable goals, (c) presenting facts and arguments, (d) listening to and reflecting on what has been said, (e) clarifying problems and resolving conflicts, (f) adjusting quickly to new facts/ideas, (g) proposing and examining possible options, and (h) making reasonable compromises (SCANS, 1992, pp. 2-37). Of those eight negotiation skills, we have focused on measuring (g) proposing and examining possible options and (h) making reasonable compromises as the key terminal behaviors. Because setting realistic and

Table 1

Workforce Readiness Assessment Methodology for SCANS: Negotiation Example

General Methodology	Specific Example
• Select a work environment	Analytically derived
• Job and task analysis	Analytically derived
• Select competency	Interpersonal
• Conduct component analysis of competency	Negotiates
• Specify basic skills foundation	Mathematics, Creative Thinking, Decision Making, Problem Solving, Self-Management
• Create indicator(s) for subcompetencies	Proposing and examining possible options and making reasonable compromises
• Classify indicator(s) within a cognitive science taxonomy	Carnevale & Pruitt, 1992; Walton & McKersie, 1965; Womack, 1990
• Create rapid prototype of measures of indicator(s) via test specifications	Existing simulation modified
• Select/develop final measures of indicator(s)	See Methodology section
• Select experimental/analytical design	Expert/Novice
• Run empirical studies	This report
• Analyze statistically .	This report
• Use/create norms	To be done
• Report reliability/validity of indicator(s) measure	This report
• Report on workforce readiness using multiple indicators	To be done

attainable goals, presenting facts and arguments, listening to and reflecting on what has been said, clarifying problems and resolving conflicts, and adjusting quickly to new facts/ideas are seen as prerequisites to these terminal

behaviors, they are indirectly measured by our assessment. Our measurement environment in simulation (discussed below) did not assess researching opposition and the history of the conflict.

Again following the methodology developed earlier (O'Neil et al., 1992a), we surveyed the negotiation research literature to identify the cognitive indicators known to be associated with the SCANS-identified performance requirements of (g) proposing and examining possible options and (h) making reasonable compromises. In general terms, research on negotiation has long recognized that negotiations take place in the context of mixed-motive, interdependent relationships (e.g., Kelley, 1979; Kelley & Thibaut, 1978; Pruitt & Rubin, 1986; Rubin & Brown, 1975; Walton & McKersie, 1965). The parties to the negotiation must be interdependent in some respect or there would be no reason for them to seek an agreement or resolution with each other. Similarly, their interests must represent a mixture of compatible and incompatible interests, because if their interests were utterly incompatible, there would be no basis for a resolution or agreement. Conversely, if the parties' interests were perfectly compatible there would be no conflict to resolve.

Because negotiations occur in the context of mixed-motive, interdependent relationships, negotiation presents the parties with the challenge of looking out for both their own interests as well as the interests of the other party (e.g., Blake & Mouton, 1979; Filley, 1975; Kelley, 1979; Kelley & Thibaut, 1978; Rahim, 1986; Rubin & Brown, 1975; Thomas, 1976; see Carnevale & Pruitt, 1992, for an excellent review). One enters into negotiation in order to gain an agreement which protects or serves one's own interests. However, gaining an agreement also requires watching out for the other side's interests to understand what will be acceptable to them. Thus, negotiating is a quintessentially interpersonal activity.

Walton and McKersie's (1965) distinction between distributive and integrative negotiations has been one of the most important guiding theoretical constructs in analyzing the requirements of these dual concerns in negotiations (e.g., Brett, Goldberg, & Ury, 1990; Pruitt & Rubin, 1986; Pruitt & Syna, 1984; Rahim, 1986; Tjosvold, 1990; Tjosvold & Johnson, 1983; Womack, 1990). Distributive negotiation focuses on the distribution of the available outcomes to each of the parties. One presumably seeks to gain as high

outcomes as one can, but must also see that the other side gets enough to agree to the resolution. Integrative negotiation involves seeking ways in which the outcomes available to the parties can be increased.

Thus, research on negotiation has documented that performance in proposing and examining possible options and in making reasonable compromises requires that one look out for both one's own interests and the interests of the other party. In doing so, an effective negotiator must be effective in both increasing possible joint outcomes (integrative negotiation) and distributing those outcomes (distributive negotiation).

In terms of the first SCANS-identified skill we are trying to assess, the literature indicates that a negotiator is skillful in proposing and examining possible options when he or she considers whether there are options that increase the total outcomes available to the parties (the integrative aspect of proposals). Skill in proposing and examining options also includes considering options regarding how those total available outcomes are to be distributed (distributive aspects of proposals). With respect to the distribution of available outcomes, skillful negotiators must propose and examine options that balance their interest in maximizing their own outcomes with consideration of what will be acceptable to the other party.

In terms of the second SCANS-identified skill targeted for assessment, the literature indicates that negotiators are skillful in making reasonable compromises when those compromises balance the negotiators' concern with securing good outcomes for themselves with their understanding of what the other side needs to agree to the compromise (the distributive aspect of compromises). In other words, a compromise is *un*reasonable either if it sacrifices one's own interests more than would be necessary to gain agreement, or if it does not reflect consideration of what the other side will need to agree. Part of the skill in making reasonable compromises is to not compromise one's own interests where equal or greater gains can be offered to the other side through a proposal which increases both sides' outcomes (the integrative aspect of compromises).

The SCANS performance criteria and the cognitive indicators of those performance criteria found in the negotiation literature guided the development of our negotiation measure. With regard to the SCANS

performance criteria, we needed to simulate the activities of proposing and examining options and making reasonable compromises, and the exchange of proposals and counter-proposals. With regard to the cognitive indicators identified in the negotiation literature, the exchange of proposals should take place in the context of a situation of mixed-motive interdependence, with both distributive and integrative dimensions. Such a context is provided by our computer simulation.

Simulation as an Assessment Context

O'Neil (1992, p. 10) has defined simulation as "a process that imitates a physical or functional situation, thereby providing experience not easily gained otherwise, and that permits realistic problem-solving for individuals or teams of students." For example, computer-based instructional simulators can be used to measure performance as a routine by-product of instruction. In turn, simulation may be conceptualized as the third generation of computer measurement (Bunderson, Inouye, & Olsen, 1989). Bunderson et al. define the four generations as follows. *Generation 1, computerized testing*: administering conventional tests by computer, for example, computerized versions of either intelligence tests such as the Slosson Intelligence Test (Hedl, O'Neil, & Hansen, 1973), personality tests such as the Minnesota Multiphasic Personality Inventory (Dunn, Lushene, & O'Neil, 1972), or achievement tests as in computer-managed instruction (CMI) (O'Neil, Hedl, Richardson, & Judd, 1976). *Generation 2, computerized adaptive testing (CAT)*: adapting the test to the individual test-taker by selecting each succeeding task on the basis of the test-taker's performance on previous tasks (e.g., computer-adaptive testing). *Generation 3, continuous measurement*: using calibrated measures embedded in a curriculum to continuously and unobtrusively estimate changes in each learner's proficiency (e.g., simulations in this report). *Generation 4, intelligent measurement*: introducing knowledge-based (artificially intelligent) computing to the decision-making processes of computerized measurement, for example, in scoring constructed responses (Braun, in press; Braun, Bennett, Frye, & Soloway, 1990). Progress towards these four generations of computerized measurement is documented in Gutkin and Wise (1991). In general, such technology opportunities for assessment can be viewed from a perspective of both presumed advantages and

possible problem areas (see Table 2). We feel that the advantages outweigh the disadvantages.

We will now describe the negotiation simulation we have developed with an emphasis on a conceptual explanation of how we simulate and measure the cognitive indicators of the performance criteria identified. The simulation was conducted via computer, and a full description of the logistics of the simulation is found in the procedure section of this report.

The simulated negotiation situation is a job contract negotiation between a graduating Masters of Business Administration student (MBA) and a management consulting firm. In the simulation, the management consulting firm have already interviewed the MBA and decided that they would like to hire the MBA. The MBA is also interested in working for the management consulting firm. Thus, there is some interdependence between the parties based on the compatible interests of working out an employment relationship. In the simulation, the two parties have come together to negotiate the terms of the contract with respect to three issues: (a) billable hours, (b) severance pay, and (c) salary. The MBA prefers to have to bill fewer hours, to have a longer severance pay period should he or she be laid off, and to have a higher salary.

Table 2

Technology Opportunities for Assessment

Presumed advantages	Possible problem areas
1. Provide consistent, high-quality assessment available on large scale	1. Cost
2. Provide high-quality assessment at remote sites	2. Validity
3. Provide hands-on, performance-oriented instruction/testing	3. Program maintenance
4. Permit individualized testing	4. Equity
5. Permit team assessment	5. Fidelity
6. More comprehensive domain coverage	6. Increased security
7. Quicker reporting	7. Negative teacher attitudes
8. Provide rapid update of testing materials	
9. Reduce testing time	
10. Reduce reliance on highly skilled personnel	

In contrast, the representative for the management consulting firm prefers that the MBA work more billable hours, receive severance pay for a shorter period after a layoff, and receive a smaller salary. Thus, there are also some incompatible or competitive aspects to the interdependence between the two parties.

To build in both integrative and distributive dimensions to the simulation, the parties also have offsetting priorities regarding the three issues being negotiated. Because the MBA is characterized as being very concerned with having a life outside work, the billable hours issue is most important to him or her. Because of the MBA's concern with the volatility of the consulting industry in the present economy and the common layoffs which result, the severance pay issue is moderately important to the MBA. Because the range of the salary being negotiated is quite satisfactory, the salary issue is least important. Without also elaborating the rationale for the management consulting firm representative's preferences here, the salary issue is most important to the management consulting firm representative, followed by severance pay and billable hours respectively.

The offsetting priorities create some integrative potential in the negotiation simulation. The MBA can compromise on the issue of least importance to him or her (salary) in exchange for a concession from the management consulting firm representative on the issue of most importance to the MBA (billable hours). The management consulting firm representative is likely to be willing to do this because he or she receives a better arrangement on the issue of most importance to him or her (salary) in return for a concession on the issue of least importance to him or her (billable hours). Besides this integrative aspect of the negotiation, the parties must also consider the total, overall distribution of the good outcomes between the parties to be generated by the conclusion of a job contract.

The subject's task in the simulation is to exchange proposals and messages with the other side to try and reach an agreement. As will be explained in the procedure section, the subject is led to believe that the "other party" is a person also sitting at a networked computer terminal in a computer laboratory. In fact, the "other party" is a computer program designed to reciprocate the subject's proposals in terms of the opposing interests identified above.

Because mixed-motive interdependence is built into the negotiation situation, subjects will be successful in achieving attractive agreements to the extent they exchange offers with the dual concerns in mind as discussed above. Specifically, the subject (who always plays the role of the MBA student) will need to propose options and make reasonable compromises with respect to the MBA's interests as well as the interests of the programmed management consulting firm representative along both the distributive and integrative dimensions to elicit favorable offers from the other side. With respect to the distributive aspect of the negotiations, the computer will respond with counter-proposals which distribute the outcomes based on the same balance of self and other's interests as the subject's proposal. With respect to the integrative aspect of the negotiations, the programmed management consulting firm representative offers a counter-proposal which concedes on the billable hours issue to the same extent that the subject concedes on the salary issue in his or her proposal.

With the negotiation situation so constructed and the management consulting firm representative's counter-proposals so programmed, the management consulting firm representative's counter-offer is a measure of the subject's skill in proposing and examining options and in making reasonable compromises. Regarding proposing and examining options specifically, the management consulting firm's counter-proposal reflects the same balancing of the interests of both parties as the subject's proposal reflected. In other words, the management consulting firm's counter-proposal reflects the subject's skill with respect to the distributive aspect of proposing and examining options. The management consulting firm's counter-proposal also reflects the subject's skill with respect to the integrative aspect of proposing and examining options. The counter-proposal will offer the same level of concession on the issue of least importance to the management consulting firm representative as the level of concession the subject offered on the issue of least importance to him or her. Thus, subjects elicit counter-proposals that are valuable to them by proposing options which reflect their own and the "other party's" interests on both the distributive and integrative dimensions.

Calculating the value of the counter-offer this way is essentially the same as assigning a point value to each subject's final proposal based upon the other

party's pay-off matrix. Calculating the value of the final counter-proposal and assigning a point value to the MBA student's final proposal itself, based upon the worth of the proposal to the other party, are the same thing. Additionally, this approach fits neatly with the mechanics of the simulation: The value of the final counter-offer represents the worth of the subject's proposal to the other party.

Similarly, the management consulting firm's counter-proposal is also a measure of skill in making reasonable compromises. With respect to the distributive aspect of skill in making reasonable compromises, the management consulting firm's counter-proposal reflects the same level of compromise of one's own interests for the other party's interests as the subject's offer. With respect to the integrative aspect of skill in making reasonable compromises, the management consulting firm's counter-proposal reflects the level of providing the other side with higher outcomes without an equal sacrifice of one's own outcomes. Specifically, the management consulting firm's counter-proposal reflects the same level of concession on the issue of least importance to one's self to provide greater outcomes to the other on the issue of greatest importance to them.

With the conceptual aspect of our negotiation skill measure thus defined, we will now report on an initial validation study of that measure. In the course of reporting that study, a more detailed description of the actual operation of the simulation will be provided.

Validity of the Simulation Assessment

The validation study we conducted was based on an expert/novice criterion group approach. We assumed that a test that validly measures a given skill should be able to discriminate between experts and novices in that skill. Accordingly, we conducted the simulation with both novices and experts in negotiation. By quantifying the value or quality of the management consulting firm's counter-proposal (how we do this is explained in the procedure section), we were able to compare the quality of the counter-offers the experts and novices elicited. Thus, our main hypothesis was that experts would receive better counter-offers than novices.

Further, if the simulation represents a valid negotiation environment, we would expect two critical negotiation biases, the self-serving bias and the fixed-

pie bias, to be present in our computer simulation. Based on research by Sillars (1981), we hypothesized that subjects' perceptions of their own behavior and the other party's behavior would be subject to a self-serving bias. The self-serving bias, in the context of negotiations, refers to the tendency for people to see the other party as being less cooperative and reasonable than themselves. The self-serving bias interferes with effective distributive negotiation because one sees oneself as willing to compromise more than the other party and to demand greater compromises from the other party than the situation would otherwise dictate. The result is interference with the ability of parties to reach agreements which distribute outcomes to the satisfaction of both parties.

The self-serving bias also tends to inhibit effective integrative negotiation. Effective integrative negotiation requires that the parties mutually exchange information and cooperate to discover ways in which the outcomes of both parties might be increased. However, if the exchange and cooperation is not mutual, the side exchanging less information and being less cooperative will gain advantages in the distributive aspect of negotiations. Therefore, a party will not exchange information and cooperate in the manner necessary to realize integrative potential unless that party believes the other party is being just as forthcoming and cooperative. Because of the self-serving bias, however, parties tend to see the other party as being less forthcoming and cooperative and so are not willing to be forthcoming and cooperative themselves.

Since the other party's behavior was programmed in our computer simulation to be a mirror image of the subject's negotiating behavior, differences in subject ratings of the subject's own behavior and the other party's behavior are a measure of a self-serving bias. Accordingly, we hypothesized that the subjects in general would perceive themselves as more reasonable and fair than the other party.

Finally, the conceptual basis for our computer simulation is the idea that in order to be successful in negotiations, a negotiator must process all aspects of the negotiation in terms of the other party's interests was well as his or her own. The structure of the simulation situation built in mixed-motive interdependence with both distributive and integrative dimensions. Since the management consulting firm representative was programmed to respond to the MBA subject in a particular way, it was necessary, to be successful in the negotiation, for the MBA subject to think of multiple aspects of the negotiation

(e.g., options, compromises, messages) in terms of both the other party's and his/her own interests.

As constructed, the simulation facilitates measurement of performance outcomes. However, outcome measures are not direct evidence of some processes we are inferring. Consequently, we were also interested in investigating whether success in terms of outcome measures is associated with cognitively processing facets of the negotiation in terms of consideration of both the other party's and one's own interests. If such cognitive processing is associated with outcome success, we expect subjects who are more successful in the negotiation will be more cognizant of the difference between approaching a negotiation with consideration of only one's own interests and approaching a negotiation with consideration of both one's own and the other party's interests.

Methodology

Subjects

Two groups of subjects, one group of novice negotiators and one group of experts, participated in the study.

Experts. Ten experts were drawn from graduate students who had just completed a course in negotiation in a Masters of Business Administration (MBA) program at a prestigious, state university business school. The study was conducted in two sessions, with five students participating in one session and four participating in the other (a disk failure during the second data collection session caused the loss of one subject's data). All subjects were second-year MBA students. Five of the subjects were female and four were male. The youngest subject was 26 and the oldest 52, with a mean age of 32. Six subjects were White, two were Hispanic, and one was Asian. Subjects had worked an average of four years before entering the MBA program. The mean Graduate Management Admissions Test (GMAT) score was 645, with a lowest score of 580 and a highest score of 720. These graduate students were experts compared to the novice group (high school students) but would be considered intermediate if compared to a "true" expert group of negotiators.

One experimenter made an announcement concerning the study in the class, in which 30 MBA students were enrolled. In addition to $20.00 for

participation in the 1-hour study, a $20.00 prize was offered to the top performer in each session. The students were also told that they would receive feedback on their negotiation performance for participating in the study. A total of nine students participated in the study as a result.

Novices. Twenty-one participants were drawn from a business computers class in a public high school of 1400 students. Three students were randomly selected and eliminated from the analysis to maintain proportional cell sizes between expert and novice groups. Of the 18 novices, 3 were sophomores, 5 were juniors, and 10 were seniors. Six of the students indicated that they would probably attend college and 12 indicated that they would definitely attend college. Nine of the novices were female, and 9 male; 15 were White, 2 were African-American, and 1 was Hispanic. The average GPA was 3.12 (*SD* .44).

The teacher in the business computers class announced that the researchers would be visiting the class and asking them to participate. The teacher also informed the students that the study would last 15 minutes longer than the usual class period, which was the last period of the day. Additionally, the teacher told the students that if they chose to participate, they would receive $20.00. They were also told that the top performer would receive an additional $20.00.

Procedure

Each subject was seated in front of an IBM personal computer which presented the instructions, task, and subsequent questionnaire. Our computer program was a modification of Carnevale's program (e.g., Carnevale & Conlon, 1988).[1] Carnevale and Pruitt (1992) viewed negotiation as the resolution of divergent interests by mutual and voluntary decision of the parties to the conflict. They contrasted negotiation with other forms of conflict resolution, that is, resolution by *coercion, mediation* (a third party facilitates or controls the process leading to the decision), or *arbitration* (a third party controls the decision itself, decides the outcome).

The Carnevale program was developed as a way of capturing what is known as the "AEI" paradigm. The AEI paradigm is intended to operationalize the integrative/distributive distinction discussed above. In the

[1] We thank Dr. Peter Carnevale who provided his program for us to modify for this study.

paradigm, parties to a conflict face three issues. Integrative potential is operationalized by manipulating the relative priorities of the parties on the three issues. If the parties have exactly offsetting priorities on the issues (i.e., the issue of least importance to one is the issue of most importance to the other), then there is integrative potential which can be achieved by the parties mutually compromising on their respective issues of least importance. The result is that both parties receive a better arrangement on their issue of most importance. Within the paradigm, nine levels (A-I) of possible agreement are specified for each issue. The offsetting priorities are operationalized by assigning different points or values for offer levels on different issues, such as the points represented in Table 3. The possible trade-offs on issues create the integrative potential. The distributive aspect is represented by the fact that each side prefers the opposite end of the range on all of the three issues The name AEI derives from the fact that the best solution to both the integrative and distributive dimensions is AEI (see Neale & Bazerman, 1991).

Carnevale operationalized the AEI paradigm with his computer program. Using this program, Carnevale has investigated a variety of factors affecting dispute resolution processes and outcomes, including a number of investigations examining third-party mediation and arbitration scenarios, in addition to two-party negotiation scenarios (e.g., Carnevale, 1986; Carnevale & Henry, 1989; Carnevale & Mead, 1990). Factors that he has examined include time pressure, perceived expertise, strategy choices, etc. (e.g., Carnevale, 1991; Carnevale & Conlon, 1988; Carnevale & Keenan, 1990).

We have adapted Carnevale's program via one major modification. As developed by Carnevale, the program would not contingently respond to the subject in any dynamic way. Accordingly, we built in an algorithm such that the computer would respond to the subject's negotiating behavior in terms of the issue chart for the management consulting firm representative (see Table 3). Specifically, a concession by the subject on a salary issue was answered by an equal concession on the billable hours issue. The management consulting firm representative role was programmed to follow a simple tit-for-tat strategy on the severance pay and billable hours issue. In other words, the computer would concede the same number of proposal levels from its most favored level (I) as the subject would concede from his or her most favored level (A). Finally, the management consulting firm representative's role was

Table 3

MBA and Management Consulting Firm Representative Issue Chart of Point Values

Issues		
Billable Hrs per Week	Severance (Weeks)	Salary (Annual)
MBA Student		
A 120	A 80	A 40
B 105	B 70	B 35
C 90	C 60	C 30
D 75	D 50	D 25
E 60	E 40	E 20
F 45	F 30	F 15
G 30	G 20	G 10
H 15	H 10	H 5
I 0	I 0	I 0
Management Consulting Firm Representative		
A 0	A 0	A 0
B 5	B 10	B 15
C 10	C 20	C 30
D 15	D 30	D 45
E 20	E 40	E 60
F 25	F 50	F 75
G 30	G 60	G 90
H 35	H 70	H 105
I 40	I 80	1 120

programmed such that it would accept any proposal that offered it the points equal to the EEE agreement (120) or better.

Subjects in our study were told they would negotiate with others via the computer in two negotiation sessions. They were also told that they would be negotiating a job contract between an MBA and a consulting firm. The computer, they were instructed, would randomly assign the subject to the role of either a consulting firm representative (the management consulting firm

representative) seeking to hire an MBA or an MBA seeking employment with the consulting firm. In fact, the computers were not networked, and all subjects played the role of the MBA in both sessions, while the role of the management consulting firm representative was programmed.

Subjects were instructed that the job contract negotiation centered on three issues: (a) the number of billable hours the MBA would be required to log per week, (b) the number of weeks of severance pay the MBA would receive if fired or laid off, and (c) the annual salary the MBA would receive. Table 4 shows the issue chart that was displayed on the computer screen. Each issue had nine proposal levels (listed from "A" to "I"). Subjects were told that the parties would exchange proposals and messages in the negotiation in trying to reach agreement on one proposal level for each issue.

The subjects were also instructed with respect to their relative priorities on the three issues. The subjects were told that the time outside work was highly valuable to the MBA they were playing. The severance pay issue, subjects were told, was moderately important to the MBA because the consulting market was rather volatile at the time. The salary range being discussed, the subjects were further instructed, was quite satisfactory to the MBA. Therefore, the issue of greatest importance to the MBA was billable hours, followed by severance pay and salary respectively. Subjects were subsequently shown another version of their issue chart which reflected these relative priorities on the three issues by assigning point values to each offer level for each issue. As seen in Table 5, the highest points attainable were on the billable hours issue, followed by severance pay and salary respectively.

The management consulting firm representative's role was programmed such that the representative's priorities were exactly offsetting, as seen in Table 3. Thus, integrative potential was structured into the job-contract negotiation such that if the parties reciprocally conceded on the issue of least importance to them, joint outcomes could be maximized (EEE yields 120 points for each, while AEI yields 160). The management consulting firm representative role was further programmed to reciprocate moves made by the subjects. Specifically, a concession by the subject on the salary issue was answered by an equal concession on the billable hours issue. The management consulting firm representative role was programmed to follow a simple tit-for-tat strategy on the severance pay issue. In other words, the

Table 4

MBA Issue Chart of Real Values

Issues		
Billable Hrs per Week	Severance (Weeks)	Salary (Annual)
A 20	A 9	A 80,000
B 22	B 8	B 77,500
C 24	C 7	C 75,000
D 26	D 6	D 72,500
E 28	E 5	E 70,000
F 30	F 4	F 67,500
G 32	G 3	G 65,000
H 34	H 2	H 62,500
I 36	I 1	I 60,000

Table 5

MBA Issue Chart of Point Values

Issues		
Billable Hrs per Week	Severance (Weeks)	Salary (Annual)
A 120	A 80	A 40
B 105	B 70	B 35
C 90	C 60	C 30
D 75	D 50	D 25
E 60	E 40	E 20
F 45	F 30	F 15
G 30	G 20	G 10
H 15	H 10	H 5
I 0	I 0	I 0

computer would concede the same number of proposal levels from its most favored level (I) as the subject would from his or her most favored level (A). Finally, the management consulting firm representative's role was

programmed such that it would accept any proposal that offered it the points equal to the EEE agreement (120) or better.

Subjects were further instructed that proposals and/or messages chosen from a menu of messages would be exchanged between the parties. Proposals consisted of one of the nine proposal levels for each issue (e.g., BCE). Messages could be chosen from a menu presented on the computer screen, as seen in Table 6. Messages, adapted from Carnevale and Conlon (1988), were selected which conveyed either concern for self (e.g., *You are too stubborn—make some concessions*) or concern for self and for the other party's interests (e.g., *Let's consider both of our needs and interests*).

As described above, the computer took the subjects through two practice rounds of exchanging proposals and offers before the negotiations began. Using the same scenario, each of the two negotiation sessions continued until an agreement was reached or until the negotiation had proceeded for 10 rounds, with one exchange of proposals and/or messages constituting one round. After the last round of the second negotiation session, the subjects answered questions presented on the computer screen. The questions asked the subjects to rate their own and the other party's negotiating style. Specifically, the subjects were asked to rate how cooperative/competitive and they and the other party were in the negotiations on 6-point Likert scales, ranging from *extremely competitive* to *extremely cooperative*. Subsequently, the students were asked to make pair-wise similarity ratings on a 7-point scale of the messages they had an opportunity to use in the simulation (see Table 6). Following these questions presented on computer, the subjects responded to a paper-and-pencil metacognitive questionnaire developed by O'Neil, Sugrue, Abedi, and Baker (in press). The data on the metacognitive instrument will be published elsewhere.

After finishing, the subjects were debriefed. The experimenters explained that the computers were not networked in the simulation and that the subjects were interacting with a computer program. The experimenters further explained how the computer was programmed to reciprocate the subject's negotiating behavior. Finally, the experimenters explained that the best agreement possible was AEI and offered lessons that could be learned from the experience for the real negotiations the subjects might encounter. No subject appeared to be upset by the deception, and most found it amusing that

Table 6

Message Menu

Msg. #	Concern-With-Self-Only Messages
2	You are too stubborn—make some concessions.
3	Improve your offer if you want an agreement.
7	If we can't reach an agreement, I can easily find another job.
8	This offer is a gift. What more do you want?
10	This is the very best offer that is possible.
	Concern-With-Self-and-Other Messages
1	Here's a proposal for you to consider.
4	Let's consider both of our needs and interests.
5	I hope this offer is good for you.
6	Let's make offers that are good for both of us.
9	I'm interested to see what you think of this offer.

they had, in effect, been negotiating with a mirror image of themselves. The subjects were then thanked for their participation and paid for their participation.

Results

The primary purpose of this study was to test the validity of the simulation as a measure of negotiation skills. Our main hypothesis, therefore, was that the experts, being more skilled in examining and proposing options and in making reasonable compromises, should elicit counter-offers from the programmed management consulting firm representative that represented more points to the subjects. To test this, we calculated the point values (in terms of the subject's point values) of the final counter-proposal offered by the programmed management consulting firm representative in each session (see Table 7). Since each subject completed two sessions of the negotiation simulation, we treated the value of the final counter-offer of each session as the outcome variable in a repeated measures design. The following repeated measures ANOVA tables summarize the effects for group (expert vs. novice)

Table 7

Means and Standard Deviations for the Value of the Final Counter-Offer (in Points)

Group (*n*)	*M*	*SD*
Session 1		
Expert (9)	101.67	37.91
Novice (18)	77.50	42.88
Total (27)	85.56	42.18
Session 2		
Expert (9)	126.67	26.34
Novice (18)	98.33	40.62
Total (27)	107.78	38.44

Note. Maximum value = 160 points.

and session (first negotiation session vs. second negotiation session). The differences between the expert group and the novice group approach statistical significance (F 1,26 = 3.74; p = .064) (Table 8). Students in general performed better in Session 2 than in Session 1 (F 1,26 = 7.46, p = .011) (Table 9). The latter result was expected, as we expected students to learn the implicit rule of the simulation (e.g., there were only 10 rounds in a session) during the initial session.

Table 8

ANOVA Summary Table: Between-Subjects Effects

Source of Variation	SS	DF	MS	F	Sig of F
Within Cells	55231.25	25	2209.25		
Group	8268.75	1	8268.75	3.74	.064

Table 9

ANOVA Summary Table "SESSION" Within-Subject Effect

Source of Variation	SS	DF	MS	F	Sig of F
Within Cells	21131.25	25	845.25		
Session	6302.08	1	6302.08	7.46	.011
Group by Session	52.08	1	52.08	.06	.806

In addition, the number and quality of final counter-offers that resulted in actual agreements suggested that experts were more successful in the simulation than novices. Twenty-five percent of the novice sessions (9 of 36) were concluded with an agreement. The mean value of those concluded agreements was 136.7 (*SD* 23.6). In contrast, 33% of the expert sessions (6 of 18) were concluded with an agreement. The mean value of the experts' agreements was 146.7 (*SD* 16.3). However, a χ^2 indicated that the frequency of agreements reached was not significantly different between groups. Of the agreements that were concluded, expert agreements also more frequently realized some of the integrative potential built into the simulation. We defined *some integrative potential is realized* as whenever an agreement yielded more than the 120 points received for the best purely distributive proposal (EEE) the computer would accept. This offer can only be achieved through some mutual tradeoff of the least important for the most important issue (i.e., AEI, BEH, CEG, DEF). Moreover, the experts' agreements more frequently achieved integrative potential (5 of 6 agreements or 83%) than novices' (4 of 9 agreements or 44%). (The cell sizes were too small for a statistical analysis.) Thus, as predicted, experts achieved both agreements and better agreements more frequently than novices. It should be noted that the statistical evidence for these assertions is weak.

Analysis of the subjects' ratings of their own and the other party's negotiation behavior revealed the hypothesized self-serving bias. Specifically, subjects (experts and novices combined) rated themselves as being more reasonable and fair (M= 3.76, SD = 1.02) than the "other party" (M= 2.85, SD = 1.13). A t-test revealed that difference is significant (t= 3,49; df 26; p = .002).

Analysis of the similarity ratings of the messages confirmed our expectation that subjects who more clearly distinguished between the messages according to whether the messages conveyed concern for their own interests or for the other party's interests in addition to their own would perform better in the negotiations. In our similarity rating task, subjects rated the degree of similarity of all 45 possible pairwise combinations of the messages which were available for use during the negotiation simulation. For example, in Table 6, Message 2 would be compared successively with all the remaining messages. The data collected from this task were analyzed using

the INDSCAL model option (Carroll & Chang, 1970) of the ALSCAL procedure available in SPSS.

A solution using two dimensions was found. Individual differences were clearly being modeled in terms of the relative influence of the two dimensions on subjects' perceptions of similarity between the statements. In other words, subjects were differentially influenced by these two dimensions. Additionally, one dimension was clearly more salient than the other in subjects' ratings. This primary dimension distinguished the stimulus points in terms of the criterion for which they were selected. As explained above, the messages were written to represent a distinction between conveying concern with one's own interests only and concern with both the other party's and one's own interests. Furthermore, as expected, greater differentiation of the messages in terms of this dimension was correlated with higher performance in the negotiation task (i.e., elicited final counter-offers of greater value) ($r = 0.51$, $p < .01$).

Discussion

The results were generally supportive of our hypotheses.

Validation of Simulation Assessment

The results provide evidence of the validity of the simulation as a measure of negotiation skills. Content validity was provided by both Carnevale and Conlon (1988) and our analytic tying of the simulation to the SCANS skill *negotiate*. Construct validity was examined in this study by comparing the performance of experts and novices.

Our main hypothesis was supported—that experts would be more successful than novices in proposing and examining options and making reasonable compromises as measured by the value of the final counter-offer they were able to obtain from the programmed management consulting firm representative. The statistical test for this conclusion approached statistical significance ($p = .064$). We feel that in a first study of this series (a feasibility study), our observed probability value ($p = .064$) indicates that there is support for the assertion that experts did better than novices. Although the greater frequency and value of expert agreements was found, it was not statistically significant. In general, the size of our sample is small and requires replication, but we view these results as very promising.

This encouraging initial evidence of validity suggests that further validity tests are warranted. One important question that this study did not examine is whether differences in the two subject groups other than expertise in negotiation might be responsible for the differences in performance. For example, the novice (high school students) and expert (MBA students) groups varied in age, level of education, and familiarity with the MBA negotiation scenarios, in addition to level of expertise in negotiations. Also, the validity of the simulation as a measure of negotiation skills must be further examined by using subjects who are more clearly experts in negotiation. Our MBA students had only one course in negotiation. We plan to use professional arbitrators and mediators as expert subjects. Our expectation is that the differences will be more dramatic.

Another issue related to the MBA simulation used in this study concerns the particular form of the scenario. The scenario involved an MBA negotiating a job contract with a consulting firm. Clearly, the experts in our study (MBA students) were more familiar with this scenario than the novices (high school students). Although no previous knowledge of job contracts with consulting firms was assumed or necessary to perform in the simulation, the familiarity of the situation for the experts may have aided their ability to process the information provided or engaged or motivated them more because of the relevance of job contract negotiations for graduating MBAs.

Further evidence for the validity of the measure would be provided by comparing experts and novices across different scenarios involving three issues to be negotiated between parties with mixed-motive interdependence. We are currently analyzing data from a second phase of the present programmatic research which will allow us to investigate this issue in the manner just described. In this second phase, approximately 40 experts and over 200 novices participated in the computer simulation, but with two different scenarios. The experts were third-year law students enrolled in a negotiation course. Novices were drawn from the same high school as the subjects in the present study. Half of the novices and half of the experts played the role of a high school student negotiating a job contract with the personnel manager of a movie theater regarding the number of movie passes received, the number of weekend work hours required, and the hourly wage received for the job. The other half of the novice and expert groups played the role of a

third-year law student negotiating a job contract with a law firm regarding the issues of salary, time to partnership, and required billable hours. Data from this second phase will therefore allow us to examine the effect of familiarity with the scenario on negotiation performance within an expert-novice paradigm.

Self-serving bias. Our results provide clear evidence that people in our simulation tended to see themselves as being more reasonable and fair in negotiations than the other party. These results, consistent with the literature, provide further validation of our simulated environment. In addition to the results confirming the validity of simulation, the self-serving bias findings shed light on processes which may explain outcome variables such as the value of the management consulting firm representative's final counter-offer. These findings suggest that attribution processes may be responsible, at least in part, for negotiation behavior. As explained in the introduction, such a bias could have an important impact on how effectively people propose and examine options and make reasonable compromises along both the distributive and integrative dimensions. With respect to our simulation, the self-serving bias probably interferes most with effective distributive negotiation. Because one sees oneself as willing to compromise more than the other party, one tends to demand greater compromises from the other party than the situation might otherwise dictate. Consequently, subjects may be limited in their ability to elicit more valuable counter-proposals from the programmed management consulting firm representative.

Dual-concern. The expected results of the similarity ratings analyses confirm that success in the simulation is associated with cognitively processing different facets of the negotiation in terms of both the other party's and one's own interests. Subjects who more clearly differentiated between messages that conveyed this approach to negotiations and messages that only conveyed concern for one's own interests were more successful in the negotiations. These results also provide some additional evidence of construct validity for our simulation. And, the results support our notion that cognitive processing of various aspects of the negotiations in the simulation in terms of the other party's and one's own interests is related to our outcome measures of performance.

Feasibility

This initial validation study also revealed worthwhile information about the feasibility of a computer simulation approach to measuring negotiation skills. Feasibility is usually viewed as consisting of three issues—time, cost, and performance. With respect to performance, our program is copied onto bootable disks. Thus, setting up for the simulation is as simple as restarting the IBM personal computers with a disk in the "A" drive. Furthermore, the data from the subject's negotiation interaction and the questions following the negotiation are recorded on the disk at the conclusion of the simulation, making data collection and entry into statistical programs quite simple. With respect to cost, because many high schools have IBM computer labs, there probably would be no additional cost for the hardware. Obviously, the simulation would have to be rewritten and recompiled for a Macintosh world. Thus, the hardware/software costs of this approach seem reasonable. Additionally, the time subjects took to read the instructions and complete the first session of negotiations was on the average 14 minutes (M=840.92 seconds, SD=196.58 seconds). Thus, the measurement time for an interpersonal skill of negotiation is not excessive. Obviously, some sort of interpretation feature to the simulation would have to be added if feedback to the student was desired. Further, the subjects also seemed quite engaged in the task. A number of subjects told the experimenters that they found the simulation quite interesting. In general, our experience in this initial validation study speaks favorably to the issue of the feasibility of the computer simulation approach to measurement of negotiation skills.

Conclusion

In conclusion, our analysis of the research on negotiation has identified important indicators of the negotiation skills identified in the job and task analyses conducted by SCANS (1991, 1992). First, in terms of skills in proposing and examining possible options, a negotiator must assess possible options with respect to both the negotiator's own interests and the other party's interests, and must do so for both distributive and integrative aspects of the negotiation. With respect to distributive aspects, does an option provide outcomes that are acceptable to both the negotiator and the other party? With

respect to integrative aspects, are there options that increase the outcomes for both parties?

Second, in terms of skills in making reasonable compromises, the literature suggests that a negotiator must consider compromises in terms of the other party's and his/her own interests along both the distributive and integrative dimensions. According to the distributive aspects of reasonable compromises, a party must not compromise his or her own outcomes unduly while making enough of a compromise to make a resolution acceptable to the other party. With respect to the integrative aspect of making reasonable compromises, a reasonable compromise is one that gives up some of one's outcomes for the sake of the other's only where it is not possible to provide a corresponding increase to the other side without giving up on the outcomes one receives him- or herself. In other words, a compromise is not reasonable where the outcomes offered to the other side can somehow be provided without sacrificing one's own outcomes.

Most importantly, the results of our validation study suggest that our simulation can be used to measure these research-identified indicators of negotiation performance in proposing and examining options and making reasonable proposals. The computer simulation approach to measuring negotiation skills appears to be worthy of further investigation. Further exploration along this avenue of assessment holds the promise of yielding an assessment method for other SCANS skills that can assist the United States in its endeavor to develop a workforce with the skills needed to compete successfully in today's world.

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